

MURSHIDABAD UNIVERSITY

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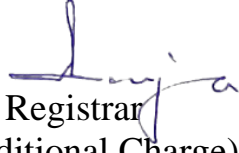
No.- MU(R)/21/D/875/I-2021-22

Date: -12.08.2022

Notification

It is notified for information of all concerned that Murshidabad University approved the syllabus of M.A/M.Sc. course of study under CBCS in the Postgraduate department of the University.

The above shall be effective for academic session 2021-2023


Registrar
(Additional Charge)
Murshidabad University

POST GRADUATE SYLLABUS IN GEOGRAPHY
CHOICE BASED CREDIT SYSTEM (CBCS)
(EFFECTIVE FROM THE ACADEMIC SESSION 2021-2022)



DEPARTMENT OF GEOGRAPHY
MURSHIDABAD UNIVERSITY
BERHAMPORE-742101
WEST BENGAL
INDIA

SYLLABUS STRUCTURE

Semester	Module	Type	Module Name	Marks	Credits
I	PG-GEO-CCT-101	Theory	Geotectonic and Geomorphology	50	4
	PG-GEO-CCT-102	Theory	Climatology	50	4
	PG-GEO-CCT-103	Theory	Economic Geography	50	4
	PG-GEO-CCT-104	Theory	Social and Cultural Geography	50	4
	PG-GEO-CCP-101	Practical	Interpretation of Topographical Maps, Aerial Photographs and Satellite Imageries	50	4
II	PG-GEO-CCT-205	Theory	Hydrology and Oceanography	50	4
	PG-GEO-CCT-206	Theory	Soil and Bio Geography	50	4
	PG-GEO-CCT-207	Theory	Philosophy of Geography	50	4
	PG-GEO-CCP-202	Practical	Statistical Techniques and Computer Application	50	4
	PG-GEO-CCP-203	Practical	Quantitative and Field Techniques	50	4

Notes: PG – Post Graduation; GEO – Geography; CC – Core Course; EC – Elective Course, OC – Open Course; T - Theory; P- Practical

- *FOR EACH THEORITICAL MODULE NO. OF CLASS ALLOCATION IS 50 LECTURE HOURS AND FOR PRACTICAL 75 LECTURE HOURS*

Semester	Module	Type	Module Name	Marks	Credits
III	PG-GEO-OCT-301	Theory	Elements of Geography (For Other Discipline)	50	4
	PG-GEO-CCT-301	Theory	Historical and Political Geography	50	4
	PG-GEO-CCT-302	Theory	Geography of West Bengal and Murshidabad	50	4
	PG-GEO-ECT-301	Theory	*Optional Elective Paper	50	4
	PG-GEO-ECT-301/A		Environmental Geography		
	PG-GEO-ECT-301/B		Fluvial Geomorphology		
	PG-GEO-CCP-301	Practical	RS,GIS and GNSS	50	4
IV	PG-GEO-CCT-401	Theory	Regional Geography Of India	50	4
	PG-GEO-CCT-402	Theory	Research Methodology In Geography	50	4
	PG-GEO-CCT-403	Theory	Population And Settlement Geography	50	4
	PG-GEO-ECP-401	Practical	*Optional Elective Paper	50	4
	PG-GEO-ECP-401/A		Environmental Geography		
	PG-GEO-ECP-401/B		Fluvial Geomorphology		
	PG-GEO-CCP-401	Practical	Dissertation and Field Report	50	4

*Optional Elective Papers: Any one to be selected

PG-GEO-ECT-301/A, PG-GEO-ECP-401/A: Environmental Geography

Or

PG-GEO-ECT-301/B, PG-GEO-ECP-401/B: Fluvial Geomorphology

CONTENTS OF SYLLABUS IN DETAILS

SEMESTER-1

PG-GEO-CCT-101: GEOTECTONICS AND GEOMORPHOLOGY (Theoretical – 50 marks / 4 credits)

UNIT-I: Concepts in Earth Science

- 1.1: Spatial scale, temporal scale and related concepts. Systems, feedback, equilibrium and threshold. Concept of uniformitarianism.
- 1.2: Geological time-scale and major events of earth history. Principles of relative and absolute dating.
- 1.3: Principles of measuring landforms and monitoring the evolution. Significance of process studies.
- 1.4: Plate tectonic as a unified theory of global tectonics.

UNIT – II: Rivers and River Basins

- 2.1: River hydraulics: flow and energy. Hydraulic geometry of streams.
- 2.2: Catchment processes and fluvial processes. Factors regulating entrainment, transportation and deposition of sediments.
- 2.3: Adjustment of channel forms and patterns to morphodynamic variables.
- 2.4: Fluvial landforms (Terraces, Alluvial fans and Floodplains): Genetic classification, ordering, formation and evolution.

UNIT – III: Evolution of Landforms

- 3.1: Concept of morphogenetic Region and landforms.
- 3.2: Classification and evolution of Periglacial landforms.
- 3.3: Coastal morphodynamic variables and their influence on evolution of coastal forms.
- 3.4: Models of slope evolution: Ideas of Davis, Penck and King.

UNIT – IV: Applied Geomorphology

- 4.1: Concept of Anthropogeomorphology. Geomorphic approach to hazard studies.

- 4.2: Factors, vulnerability, consequences and management of earthquakes, tsunamis and landslides.
- 4.3: Factors, vulnerability, consequences and management of Arsenic contamination of ground water.
- 4.4: Flood, River bank erosion and integrated river bank management.

Suggested Readings:

1. Bloom, A. L., (2001): Geomorphology: A Systematic Analysis of Late Cenozoic Landforms
2. Prentice-Hall of India, New Delhi Bridges, E. M., (1990): World Geomorphology, Cambridge University Press, Cambridge
3. Christopherson, R. W., (2011): Geosystems: An Introduction to Physical Geography, 8 Ed.,
4. Macmillan Publishing Company Kale, V. S., and Gupta, A., (2001): Introduction to Geomorphology, Orient Longman, Hyderabad
5. Knighton, A. D., (1984): Fluvial Forms and Processes, Edward Arnold Publishers, London
6. Selby, M. J., (2005): Earth's Changing Surface, Indian Edition, OUP
7. Singh, S. (1998): Geomorphology, Prayag Pustak, Allahabad
8. Skinner, B. J., and Stephen, C. P., (2000): The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons
9. Thornbury, W. D., (1969): Principles of Geomorphology, Wiley

PG-GEO-CCT-102: CLIMATOLOGY (Theoretical – 50 marks / 4 credits)

UNIT-I: Atmosphere, Heat and Water Budget

- 1.1: Climatology and its relation to Meteorology; Concept of Macro, Meso and Micro-climate.
- 1.2: Origin and Nature of Atmosphere; the role of Oxygen, Carbon-dioxide and Ozone.
- 1.3: Heat budget of the Earth; Heat Island, Coriolis force and other forces controlling Wind motion, Pressure gradient, friction, convergence and divergence.
- 1.4: Water budget; Global and Regional Water Balance.

UNIT-II: Precipitation formation and Monsoon mechanism

- 2.1: The role of water vapour in the atmosphere; Evaporation and Condensation by Adiabatic and Diabatic Processes.

2.2: Theories of rain-drop formation.

2.3: Monsoon Variability in relation to IOD (Indian Ocean Dipole).

2.4: MONEX and Numerical Model of Monsoon.

UNIT-III: Weather disturbances and Forecasting

3.1: Source regions and characteristics of Air mass; Front genesis.

3.2: Extreme weather events: Thunder storm, Heat waves, Cold Waves, Drought and Cyclones.

3.3: ENSO phenomena: mechanism and impact.

3.4: Techniques of Weather forecasting: short, medium and long range.

UNIT-IV: Climatic Classification and Applied issues

4.1: Classification of World climate: Oliver and Trewartha.

4.2: Bio-climatic regions of the World; Agro-climatology.

4.3: Global warming and Climate change: Causes and consequences.

4.4: Climatic Hazards, mitigation and adaptive measures.

Suggested Readings:

1. Barry, R. G., and Carleton, A. M., (2001): Synoptic and Dynamic Climatology, Routledge, UK
2. Barry, R. G., and Chorley, R. J., (1998): Atmosphere, Weather and Climate, Routledge, New York
3. Critchfield, H. J., (1987): General Climatology, Prentice-Hall of India, New Delhi
4. Lal, D. S., (1993): Climatology, 3rd edition, Chaitanya Pub. House, New Delhi
5. Lutgens, F. K., Tarbuck, E. J., and Tasa D., (2009): The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey
6. Oliver, J. E., and Hidore, J. J., (2002): Climatology: An Atmospheric Science, Pearson Education, New Delhi
7. Singh, S., (2013): Climatology, Prayag Pustak Bhawan, Allahabad
8. Trewartha, G. T., and Horne L. H., (1980): An Introduction to Climate, McGraw

PG-GEO-CCT-103: ECONOMIC GEOGRAPHY (Theoretical – 50 marks / 4 credits)

UNIT-I: Concept of Resources and Economics

- 1.1: Concept of Resource, Resistance and Neutral stuff. Resource creating factors: Nature, Man and Culture. Resource adequacy and concept of scarcity.
- 1.2: Conservation and Management of Land-Water-Biotic Resources; Human Resources.
- 1.3: Energy Resources: Renewable and Non-renewable; Conservation and Development.
- 1.4: Ranking of world economies. Resource classification: Ackerman's scheme.

UNIT-II: Agricultural Economy

- 2.1: Agricultural Regions: Concepts and Techniques of Delineation.
- 2.2: Role of Technical Changes in Agricultural Productivity and Efficiency: Green and White Revolution – Success and Failures in India.
- 2.3: Concept of Urban, Peri-urban Agriculture and Blue revolution.
- 2.4: Agriculture in India: Land-reforms, nutrition and diversification of crops.

UNIT-III: Industrial Economy

- 3.1: Classification of Industries; Theories of Industrial Location: Losch, Smith, Hoover.
- 3.2: Major industrial regions. Spatial distribution of manufacturing industries: Petroleum refining and Textile with special reference to India.
- 3.3: Industrial Policy, Role of Liberalization, Privatization and Globalization.
- 3.4: Emerging Industries with special reference to IT Sector.

UNIT-IV: Transport, Trade and Commerce

- 4.1: Concept of Distance, Connectivity and Accessibility; Intra-regional and Inter-regional.
- 4.2: Models of Transportation and Transport costs; Comparative cost advantages.
- 4.3: International and Interregional Trade, Role of International Agreements & Organizations- GATT, WTO, World Bank.
- 4.4: Concept of E-Commerce, Concept of Export Processing Zone and Special Economic Zone.

Suggested Readings:

- 1. Alexander J. W. (1963): Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
Bagchi-Sen S. and Smith H. L. (2006): Economic Geography: Past, Present and Future
- 2. Taylor and Francis. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. (2000): The Oxford

3. Coe N. M., Kelly P. F. and Yeung H. W. (2007): Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
4. Combes P., Mayer T. and Thisse J. F. (2008): Economic Geography: The Integration of Regions and Nations, Princeton University Press.
5. Durand L. (1961): Economic Geography, Crowell.
6. Hodder B. W. and Lee Roger (1974): Economic Geography, Taylor and Francis.
7. Wheeler J. O. (1998): Economic Geography, Wiley.
8. Willington D. E. (2008): Economic Geography, Husband Press.

PG-GEO-CCT-104: SOCIAL & CULTURAL GEOGRAPHY (Theoretical – 50 marks / 4 credits)

UNIT-I: Concepts in Social Geography

- 1.1: Social Geography: Definition, Evolution, Nature of Social Geography and Approaches
- 1.2: Concepts of Social structure, social processes and social patterns; Significance of models in Social geography.
- 1.3: Concept of Welfare and Social Well-being; Social Well-being in India, Social pathology.
- 1.4: Concept of social inequality, Social conflict and peace, social security, social justice and social planning

UNIT – II: Elements of Social Geography

- 2.1: Space in Social Geography: material and social space
- 2.2: Social Structure in India: Economic and Ethnic-Caste and Tribe.
- 2.3: Geography of Religion: The World and India
- 2.4: Geography of language: Classification and spatial distribution of language in world and in India.

UNIT – III: Concepts in Cultural Geography

- 3.1: Definition, nature and evolution of Cultural Geography.
- 3.2: Origin of culture: Concepts of cultural hearth and cultural realm.
- 3.3: Cultural System and Diffusion.
- 3.4: Cultural Segregation, Cultural Diversity and Cultural Regeneration.

UNIT – IV: Social – Cultural Relations

4.1: Three fold Divisions of Societies.

4.2: Socio-Cultural Transformation; Culture and Environment.

4.3: Cultural landscape after Carl O'Sauer, Cultural area and Cultural region. Formation of Cultural Regions in India.

4.4: Acculturation, Metropolitan Culture and Cultural Transformation and Globalization.

Suggested Readings:

1. Ahmad, A.: Social Structure and Regional Development, Rawat Pub. Co., New Delhi, 1993.

2. Ahmad, Aijazuddin : Social Geography, Rawat Publications, New Delhi, 1999.

3. Bhattacharya, D.C.: Sociology, Vijaya Publishing House, Kolkata, 7th edition, 2002.

4. Bhowmick, Prabodh Kumar Ed :Tribal people of India : Societyculture and development (R N, Bhattacharya Kolkata, 2008), (DELNET)

5. Bhupinder Singh and Mahanti, Neeti, Tribal policy in India.(Inter- India Publication, New Delhi, 1997) (NHRC)

6. Blunden, J., Haggett, P., Harnnett, C. and Sarre, P. (1985): The Fundamentals of Human Geography, Harper and Row, New York.

7. Carter, J. And Jones, T. 1989 : Social Geography: An Introduction to Contemporary Issues, Edward Arnold, London.

8. Choudhary, R N and Naqvi :Commentary on the scheduledcastes and scheduled tribes act, 1989. (Orient Publication, New Delhi, 2007) (DELNET)

9. Danda, Ajit K.: Ethnicity in India, Inter-India Publications,

10. De Blij H.J. 1995 : The Earth: An Introduction to its Physical and Human Geography, John Wiley and Sons Inc., New York.

11. Dreze Jean, Amartya Sen, Economic Development and Social opportunity, Oxford University Press, New Delhi, 1996.

12. Dubey, S.C.: Indian Society, National Book Trust, New Delhi, 1991.

13. Jones, Emrys and John Eyles : An Introduction to Social Geography, Oxford University Press, London, 1977.

14. Gupta, Ramnika: Tribal Contemporary Issues: Appraisal and Intervention, Concept Publishing Company, 2007.
15. Khare, R.S. : Cultural Diversity and Social Discontent, Sage India, New Delhi, 1998.
16. Mandelbaum, David G. : Society in India, University of California Press, Berkley, 1970.
17. Massey, James Ed :Indigenous people: Dalits issues in today'stheological debate (ISPCK, Delhi, 1994) (DELNET)
18. Meena, Radhakrishna :Dishonoured by history : Criminal tribes &British colonial policy. (Orient Longman, New Delhi, 2001) (NHRC)
19. Mehta, Parkash :Tribal rights. (Shiva Publishers Distrbutors,Udaipur, 1996) (NHRC)
20. Parvthamma, C : Scheduled Castes and Tribes. (New Delhi,1984) (DELNET)
21. Rao C,N. Shankar: Sociology, S Chand and Company Limited, New Delhi, 2005.
22. Rao, M.S.A.: Urbanisation and Social Change, Orient Longmans, New Delhi, 1970.
23. Rao, Vijendra K R V :Scheduled Castes and Tribes. (New Delhi,1984) (DELNET)
24. Sareen, T.R. and S.R. (ed.) : Castes and Tribes of India, Anmol, New Delhi, 1993.
25. Raza, Moonis and Ahmad, Aijazuddin :Atlas of tribal India : Withcomputed tables of district- level data and its geographical.
26. Russell, R V :Tribes and Castes of the Central Provinces of India.(Delhi, 1975) (DELNET)
27. Russell, R.V :Tribes and Castes of the Central Provinces of India,(London, 1916)
28. Sarkar, H S :Safeguards for Scheduled Castes and Tribes (NewDelhi, 1981) (DELNET)
29. Schwartzberg Joseph; An Historical Atlas of South Asia, University of Chicago Press,
30. Sen, Amartya and Drze Jean, Indian Development: Selected Regional Perspectives, Oxford University Press, 1996.
31. Sen, Jyotirmoy (2007): A Text Book of Social and Cultural Geography, Kalyani Publishers
32. Singer, Milton and B.S. Cohn (ed.): Structure and Change in Indian Society, Aldine, Chicago, 1968.
33. Singh, K.S.: Tribal Situation in India, Indian Institute of Advanced Studies, Shimla, 1972.
34. Singh, K S :Scheduled Tribes : People of India.
35. Singh, K.S :Jawaharlal Nehru : Tribes and tribes and tribal policy.(Anthropological Survey of India, Calcutta, 1989) (DELNET)
36. Smith, David: Geography: A Welfare Approach, Edward Arnold, London, 1977

37. Sopher, David E.: An Exploration of India, Longman, London, 1980.
38. Srinivas, M.N.: Social Change in Modern India, Orient Longman, 1966.
39. Srinivas, M.N. (ed.): Caste: Its Twentieth Century Avatar, Penguin India, New Delhi, 1997.
40. Upadhyay, H C :Reservation for Scheduled Castes and Scheduled Tribes (Anmol Publications, New Delhi, 1991) (SCJL)

**PG-GEO-CCP-101: Interpretation of Topographical Map, Aerial Photograph and Satellite Imagery
(Practical – 50 marks /4 credits)**

UNIT-I: Interpretation of Topo-sheet

- 1.1: Referencing scheme of Survey of India Topographical Maps of different scales. Extraction of Thematic information from Topographical Map.
- 1.2: Comparative assessment of Topographical maps, Aerial photos and Satellite images in representation of geographical data.
- 1.3: Preparation of altimetric frequency curves and hypsometric curves of drainage basins.
- 1.4: Extraction of radii of curvature and sinuosity and braiding indices of channels.

UNIT – II: Interpretation of Aerial Photograph

- 3.1: Geometry of Aerial photographs and determination of scale. Principles of ortho- rectification and mosaicking.
- 3.2: Delineation of overlapping area and effective area. Techniques of physical and cultural feature identification from Aerial photographs.
- 3.3: Preparation of thematic overlays from Aerial photo pairs and their interpretation.
- 3.4: Determination of height from stereo-pairs using parallax bar.

UNIT – III: Interpretations of Satellite Images

- 2.1: Fundamental principles and stages in Remote Sensing. Principles of preparing FCCs and classified images.
- 2.2: Common types of IRS and Landsat sensors and their suitability for analysis of geographical information. Indian referencing scheme of IRS sensors.

2.3: Extraction of Physical and Cultural features from satellite images of various resolution and band combinations.

2.4: Detection of change from multidated maps and/or images (including images captured from web based earth observation Programmes).

UNIT-IV: Laboratory Notebook and Viva Voce.

Suggested Readings:

1. Command of the Defence Council: Textbook of Topographic Surveying, Ministry of Defence, London, Fourth Edition, 1965
2. Cromley, Robert G., 1997: Digital Cartography, Prentice Hall, Englewood Cliffs, New Jersey, First Edition
3. Ebdon, David: Statistics in Geography: A Practical Approach, Basil Blackwell Publisher, Oxford, England, 1983
4. Frank, Harry & Steven C. Althoen, 1994: Statistics: Concepts and Applications, Cambridge University Press, Cambridge, UK, Cambridge low price edition, 1997.
5. Misra, R.P.,: Fundamentals of Cartography, Concept Publishing Company, New Delhi, Revised & Enlarged Edition, 1989
6. Robinson, Arthur H., Morrison, Joel L., Muehrcke, Philip C., Kimerling,
7. A. Jon and Guptill, Stephen C.: Elements of Cartography, John Wiley & Sons, Inc., N.Y., Sixth Edition, 1995
8. Raisz Erwin,: Principles of Cartography, International Student Edition, McGraw-Hill Book Co. Inc., Tokyo, Japan, First Edition 1962
9. Raisz, Erwin,: General Cartography, McGraw Hill Book Co., New York, 1938
10. Sarkar, Ashis: Practical Geography – A Systematic Approach, Orient Longman, Cal First Edition, 1991
11. Sarkar, Ashis and Roy, P., 1983: Some selected Map Projection for India – their relative efficiencies, Geographical Review of India, Kolkata, Vol. 43, No. 2
12. Singh, R. L.: Elements of Practical Geography, Kalyani Publishers, New Delhi, First Ed., 1979
13. Stout, K.J. and Blunt, L., 1994: Three-Dimensional Surface Topography, Penton Press, London, First Edition

SEMESTER II

PG-GEO-CCT-201: HYDROLOGY & OCEANOGRAPHY (Theoretical – 50 marks / 4 credits)

UNIT-I: Hydrology

1.1: Water in earth: forms, occurrences and properties.

1.2: Significance of the global hydrological cycle with special reference to global storage and transportation of heat.

1.3: Surface Hydrology: delineation, properties and significance of drainage basin as a hydrological unit. Run-off: components and cycle.

1.4: Groundwater Hydrology: Components, factors, processes and laws controlling movement and storage.

UNIT – II: Applied Hydrology

2.1: Precipitation, evaporation and transpiration in different land use/land cover conditions. Modern methods of recording these attributes.

2.2: Water management in tropical farmlands and cities: Techniques and approaches.

2.3: Rain making and rainwater harvesting.

2.4: Principles of Integrated River Basin Management.

UNIT – III: Morphology of Ocean Basins

3.1: Classification, characteristics and origin of the major structural and morphological features of the ocean floor with particular reference to plate tectonics.

3.2: Bottom topography of Indian Ocean: Characteristics and Evolution.

3.3: Oceanic sediments: Origin, Classification and Movement.

3.4: Coral Reefs and Atolls: Types, Factors and Evolution.

UNIT – IV: Properties of Ocean Water and Utilization of Oceans

4.1: Water mass: origin, evolution, physical and chemical properties. Air-sea interactions.

4.2: Waves, tides and currents: formation, classification and significance.

4.3: Sea level change: causes and implications.

4.4: Ocean as a resource: Anthropogenic utilization of the oceans. Importance of EEZ and CRZ, Laws and Conventions.

Suggested Readings:

1. Brooks, K.N., Ffolliott, P.F., Gregersen, H.M and De Bano, F.B. (2003): Hydrology and the Management of Watersheds, 3rd edition, Wiley Blackwell, Chichester.
2. Brutsaert, W. (2005): Hydrology: An Introduction, Cambridge University Press, Cambridge.
3. Carter, R.W.G. (1988) : Coastal Environments: An Introduction to the Physical, Ecological and Cultural Systems of Coastlines , Academic Press, London.
4. Chow, V.T. (1988) :Applied Hydrology , McGrawHill Education, New York.
5. Dingman, S.L. (2002): Physical Hydrology, 2nd edition, Prentice Hall, Englewood Cliffs.
6. Ganeri, A. (1994): The Ocean Atlas, Dorling Kindersley, London.
7. Keith, D. and Mays, L.W. (2004): Groundwater Hydrology, 3rd edition, Wiley, Chichester, Kinkade Levario.
8. Pinet, P.R. (2006) Invitation to Oceanography, 4th edition, Jones & Bartlett Pub. New York.
9. Woodroffe, C.D. (2003): Coasts: Form, Process and Evolution , Cambridge University Press, Cambridge
10. Pugh, D. (2004): Changing Sea Levels. Effects of Tides, Weather and Climate, Cambridge University Press, Cambridge.

PG-GEO-CCT-202: SOIL AND BIOGEOGRAPHY (Theoretical – 50 marks / 4 credits)

UNIT-I: Soil Geography

- 1.1: Soil as a component of Biosphere, Concept of land and soil; Physical and chemical properties of Soil.
- 1.2: Soil nutrients and organisms, Role of fertility and productivity, Soil-water-plant relationship.
- 1.3: Soil taxonomy: USDA and FAO systems of soil classification. Land capability classification.
- 1.4: Soil degradation and pollution: causes, processes, consequences and conservation measures.

UNIT-II: Plant Geography

- 2.1: Plant ecology: Habitat factors, Plant response to environment; Adaptation, Succession and Climax, Domestication of plants.
- 2.2: Phyto geographical regions; Concept of plant species, family and genera.
- 2.3: Consequences of deforestation and exploitation of targeted species; Forest Conservation, Social forestry and Participatory Management of Forest.
- 2.4: Bio-diversity: Controlling factors, depletion and significance; Bio-diversity Hot Spots.

UNIT-III: Zoo Geography

- 3.1: Evolution of Species, Darwinism and its critical appreciation; Origin of Neo-species and emerging crisis.
- 3.2: Dispersal and Migration of animals; Means and Barriers; Zoo geographical regions of the world.
- 3.3: Distribution of animals in Different Geological periods; Pre- Pleistocene and Post-Pleistocene.

3.4: Principles of animal ecology: Wild life management; Relevance of Sanctuaries with special reference to India.

UNIT-IV: Ecosystem and Ecology

4.1: Ecosystem Concept and models; Population dynamics; Principles of Landscape ecology and Human ecology.

4.2: Concept of Biological Desert: Natural and Anthropogenic.

4.3: Forms and functions of Coastal Ecosystem.

4.4: International Biological Programmes: Needs and Significance.

Suggested Readings:

1. Biswas, T.D. and Mukherjee, S.K. 1997: Textbook of Soil Science, Tata McGraw Hill.
2. Brady, N.C. and Weil, R.R. 1996: The Nature and Properties of Soil, 11th edition, Longman, London.
3. Floth, H.D. 1990: Fundamentals of Soil science, 8th edition, John Wiley and Sons, New York.
4. Morgen, R.P.C. 1995: Soil Erosion and Conservation, 2nd Edition, Longman, London.
5. Chapman, J.L. and Rens, M.J. 1993: Ecology: Principle and Applications, Cambridge University Press, Cambridge.
6. Huggett, R. 1998: Fundamentals of Biogeography, Routledge, London.
7. Kormondy, E.J. 1996: Concept of Ecology, 4th edition, Prentice-Hall, India, New Delhi.
8. Myers, A.A. and Giller, P.S. (editors) 1998: Analytical Biogeography: an Integrated Approach to Study and Plant Distribution. Chapman and Hall, London.

PG-GEO-CCT-203: PHILOSOPHY OF GEOGRAPHY (Theoretical – 50 marks / 4 credits)

UNIT – I: Evolution of Geographical Thought

1.1: Place of Geography in the classification of Knowledge.

1.2: Pre – Scientific ideas in Ancient and Medieval period, the emergence of Scientific Geography – Humbolt and Ritter.

1.3: Changing emphasis in Geography – Ratzel and Richtofen, emergence of Anthro-geography, Metaphysics, Empiricism and Positivism, Colonial Expansion and Development of Geography.

1.4: Background of the current problem in geography: Conceptual and Methodological development during 20th Century and their impact, Quantitative revolution and Geographical Information System.

UNIT – II: Geography as Social-Science

2.1: Concept of Space, Social Space and the Domain of Humanistic Geography.

2.2: Geography of Inequality.

2.3: Social Justice and Welfare Geography.

2.4: Geography of Gender.

UNIT – III: Dichotomies in Geography

3.1: Dichotomy & Dualism in Geography: Physical & Human; Regional (idiographic) vs. Systematic (Nomothetic) Approach; Inductive & Deductive Methods; Qualitative vs. Quantitative Approach.

3.2: Schaefer-Hartshorne Debate; Areal Differentiation & Spatial Organization.

3.3: Geopolitics: Concept and contemporary issues.

3.4: Interdisciplinary nature of Geography: content and approach.

UNIT – IV: Recent Trends in Geography

4.1: Recent trends in Geography: Methods and Contents.

4.2: Concept of System: classification. Significance of ecological approach in Geography.

4.3: Radicalism and Development of Critical Geography.

4.4: Post-modernism – ideological influences.

Suggested Readings:

1. Adhikari, S. (2004): Fundamental of Geographical Thought, Orient Blackswan.
2. Arentsen M., Stam R. and Thuijjs R., 2000: Post-modern Approaches to Space, ebook.
3. Bhat, L.S. (2009) Geography in India (Selected Themes). Pearson.
4. Dikshit R. D., 1997: Geographical Thought: A Contextual History of Ideas, Prentice– Hall India.
5. Hartshorne R., 1959: Perspectives of Nature of Geography, Rand MacNally and Co.
6. Hussain, M. (2014): Evolution of Geographical Thought, Rawat.
7. Kapur A., 2001: Indian Geography Voice of Concern, Concept Publications.
8. Soja, Edward 1989. Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.

PG-GEO-CCP-201: STATISTICAL TECHNIQUES AND COMPUTER APPLICATION (Practical – 50 marks / 4 credits)

UNIT-I: Probability, Sampling and Test of Confidence

1.1: Descriptive and Inferential Statistics, Probability, Scales & Levels of Measurement.

1.2: Sampling Techniques and Sampling Error.

1.3: Scaling Techniques: Rank Score, Weighted Score, and Likert Scale.

1.4: Statistical Decision theory: Social Affinity Index (SAI), t test, Type I and Type II errors, one tailed and two tailed tests.

UNIT-II: Correlations and Statistical inferences

2.1: Pearson's Product Moment and Spearman's Rank correlation coefficient and Test of significance.

2.2: Factor Analysis (Centroid Method)

2.3: ANCOVA, Partial and Multiple correlations.

2.4: Concept of Non-parametric tests: Chi-Square & Mann Whitney U Test.

UNIT-III: Computer Application in Data Processing and Representation

3.1: Data mining from internet sources: Preparation of an inventory.

3.2: Tabulation of data and its graphical representation: Population, Land use, Weather (Any one).

3.3: Use of statistical formula: Central tendency, Dispersion, Co efficient of Variation.

3.4: Analysis of Variance (ANOVA).

UNIT-IV: Laboratory Notebook and Viva Voce.

Suggested Readings:

1. Berry, B. J. L., and Marble, D. F. (eds.): Spatial Analysis – A Reader in Geography.
2. Das, N. G., 2017: Statical Methods (combined volumes) Mc.Grew Hill Education.
3. Ebdon, D., 1977: Statistics in Geography: A Practical Approach.
4. Hammond, P., and McCullagh, P. S., 1978: Quantitative Techniques in Geography: An Introduction, Oxford University Press.
5. King, L. S., 1969: Statistical Analysis in Geography, Prentice-Hall.
6. Mahmood, A., 1977: Statistical Methods in Geographical Studies, Concept.
7. Pal, S. K., 1998: Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
8. Silk, J., 1979: Statistical Concepts in Geography, Allen and Unwin, London.
9. Yeats, M., 1974: An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.

PG-GEO-CCP-202: QUANTITATIVE & FIELD TECHNIQUES (Practical – 50 marks / 4 credits)

UNIT-I: Quantitative analysis and diagrams

- 1.1: Gini coefficient, Lorenz curve and Sopher's Index.
- 1.2: Nearest Neighbour Analysis and Occupational Ternary diagram.
- 1.3: Exponential growth curve and Population projection
- 1.4: Index number and Cumulative Index Curve.

UNIT-II: Quantitative Mapping and Interpretation

- 2.1: Mean Centre of Population and its shift over time.
- 2.2. Location quotient; Z score.
- 2.3: Residual mapping; Crop combination analysis.
- 2.4: Population potential (Gravity Model); Accessibility Map (Distance/ Centrality Matrix/ MAT).

UNIT-III: Field Techniques

- 3.1: Observation Method: Traffic Composition/Flow, Bio diversity Register, Crop composition.
- 3.2: Survey Schedule: Household Survey, Market Survey, Passenger Survey and Tourist Survey.
- 3.3: Field instruments: Theodolite, Abney Level, Clinometer and Soil pH meter.
- 3.4: Land Use Study at Micro level using Cadastral Map.

UNIT-IV: Laboratory Notebook and Viva Voce.

Suggested Readings:

1. Alvi, Z. 1995 : Statistical Geography: Methods and Applications, Rawat Pub. New Delhi.
2. Pal, S.K. 1999 : Statistics for Geoscientists, Concept publishing Company, New Delhi.
3. Silk, J. 1979 : Statistical techniques in Geography, George Allen and Unwin, London.
4. Walford, P.,1995: Geographical Data Analysis, John Wiley and Sons Inc., New York.
5. Robert Stoddard,H.,2016: Field techniques and research methods in geography (Pacesetter series / National Council for Geographic Education),Hunt pub. Co., New York.

SEMESTER III

ELECTIVE COURSE FOR OTHER DISCIPLINES

PG-GEO-OCT-301: ELEMENTS OF GEOGRAPHY (Theoretical – 50 marks / 4 Credits)

Unit-1: Geomorphology

- 1.1 Fluvial processes and landforms
- 1.2 Coastal processes and landforms

Unit-2: Climatology

- 2.1 Origin and characteristics of Indian Monsoon
- 2.2 Climate change and its consequences

Unit-3: Environmental Issues in Geography

- 3.1 Concept and components of environment
- 3.2 Environmental movements in India

Unit-4: Philosophy of Geography

- 4.1 Geography in Ancient and Medieval period
- 4.2 Dichotomies and dualism in geography

Unit-5: Population and Settlement Geography

- 5.1 Population dynamics
- 5.2 Rural–urban linkages, sustainable cities

Unit-6: Social and Cultural Geography

- 6.1 Concepts of social processes, social well-being
- 6.2 Cultural segregation, cultural diffusion

Unit-7: Geography of Hazards

- 7.1 Hazards: concept and classification
- 7.2 Case study from West Bengal: landslide / flood / river bank erosion (any one)

Unit-8: Cartography

- 8.1 Concept of maps, scales, and projection
- 8.2 Concept of remote sensing and GIS

Suggested Readings:

1. Singh, S. (1998): Geomorphology, Prayag Pustak, Allahabad
2. Selby, M. J., (2005): Earth's Changing Surface, Indian Edition, OUP

3. Lal, D. S., (1993): Climatology, 3rd edition, Chaitanya Pub. House, New Delhi.
4. Singh, S., (2013): Climatology, Prayag Pustak Bhawan, Allahabad
5. Koromondy, E.J. (1989): Concepts of Ecology, Prentice Hall of India Ltd.,N.Y. New Delhi.
6. Singh, S. (1991): Environmental Geography, Prayag Pustak, Allahabad
7. Adhikari, S. (2004): Fundamental of Geographical Thought, Orient Blackswan.
8. Hudson, F. S. (1976): Geography of Settlements, Macdonald, London.
9. Ahmad, A. (1999): Social Geography, Rawat Publications, New Delhi.
10. Sarkar, A. (1991): Practical Geography – A Systematic Approach, Orient Longman, Cal First Edition.

PG-GEO-CCT-301: HISTORICAL AND POLITICAL GEOGRAPHY (Theoretical – 50 marks / 4 credits)

UNIT-I: Concept of Historical Geography

- 1.1: Historical geography: Definition, scope and content.
- 1.2: Development of historical geography as a discipline.
- 1.3: Approaches in the study of historical geography: Views Derby, Hartshorne, Sauer and Clarke; alternative ideas of phenomenological and behavioral schools – Wright and Guelke.
- 1.4: Sources of historical geography and historical maps.

UNIT-II: Historical Geography of India

- 2.1: Evolution of the identity of India: Sacred space, pilgrimage and population dynamics.
- 2.2: Medieval period with reference to travel accounts of Hiuen Tsang and Ibn-e- Battuta; Economy and urbanization in Mughal period.
- 2.3: Impact of colonialism during British period; introduction to cash crops, industrialization, decline of handloom industries; urbanization in the colonial period.
- 2.4: Introduction to railways; expansion of transport networks, development of ports, origin and development of gateway cities.

UNIT-III: Concept of Political Geography

- 3.1: Evolution of political geography: Classical- Ratzel, German Geopolitics, Mackinder, modern phase 1930-1970, Postmodern- after1970.
- 3.2: Dimensions of political geography: Political Geography as the politics of place; Functional approach, World system theory, the rise of quantitative electoral Geography.
- 3.3: Spatial perspectives: Border, frontiers, buffer zones, core and periphery, regional identity.
- 3.4: Transitions in the Political economy: Imperialism, decolonisation, post colonisation, neo liberalism and globalisation.

UNIT-IV: Issues in Political Geography and the Indian Polity

4.1: Bases of reorganization of Indian states since independence: Federalism, center state relation; social conflicts and formation of new states-advantages and disadvantages.

4.2: Concept of Electoral Geography; Approaches to the study of Electoral Politics: Areal and spatial behavioral approaches; spatial organization of electoral areas and the geography of representation.

4.3: Geopolitical setting of India and security issues; roles functions and achievements of BIMSTEC and ASEAN as international organization in Asia.

4.4: Border disputes: Border infiltration, international disputes.

Suggested Readings:

1. Dikshit, R.D. (2004): Geographical Thought: A Critical History of Ideas, Prentice Hall of India, New Delhi.
2. Hartshorne, R. (1959): Perspectives on the Nature of Geography, Rand MacNally and Co., Chicago.
3. Holt-Jenson, A. (2018): Geography- History and Concepts, Fifth Edition (Sage, London).
4. Taylor, P. and Flint, C. (2000): Political Geography, Pearson Education, Harlow, Essex
5. Cox, K.R., (2002): Political Geography: Territory, State and Society, Wiley-Blackwell, Chichester.
6. Dikshit, R.D. (1987): Political Geography and Geopolitics, Tata McGraw Hill, New Delhi
7. Dikshit, R.D. (2000): Political Geography: A Contemporary Perspective, Prentice-Hall, New Delhi

PG-GEO-CCT-302: GEOGRAPHY OF WEST BENGAL AND MURSHIDABAD (Theoretical – 50 marks / 4 credits)

UNIT-I: Physical Geography of West Bengal

1.1: Geomorphological units.

1.2: Hydro-morphological characteristics.

1.3: Climatic characteristics: Flood and drought.

1.4: Ground Water: Distribution and characteristics.

UNIT-II: Socio-Economic Issues of West Bengal

2.1: Population dynamics: Growth, migration and changing population composition.

2.2: Technological innovation, land reform and changing rural economy.

2.3: Industrialization and changing industrial scenario.

2.4: Infrastructural development and urbanization.

UNIT-III: Problems and Prospects of West Bengal

- 3.1: Hazards and disasters: Adjustment and mitigation.
- 3.2: Decay of rivers and its effect on the port industrial economy.
- 3.3: Ground water contamination and its impact.
- 3.4: Human resource development.

UNIT-IV: Geography of Murshidabad District

- 4.1: Physical landscape and hazards.
- 4.2: Population characteristics and dynamics.
- 4.3: Economy and occupational diversity.
- 4.4: Cultural heritage and tourism.

Suggested Readings:

1. Khullar, D.R. (2012): India A Comprehensive Geography, Kalyani Publisher, Ludhiana.
2. Nandy, D.R. (2001): Geodynamics of Northeastern India, ACB Pub., Kolkata.
3. Bagchi, K. (1944): The Ganges Delta. Calcutta University, Calcutta.
4. Basu, S.R. and Ghose, R.B. (2004): Contemporary Environmental Issues of Bengal Basin, ACB Pub., Kolkata.
5. Bose, S.C (1978): Geography of West Bengal. National Book Trust. New Delhi.
6. Chatterjee S.P (1949): Bengal in Maps, Orient Longmans, Calcutta.
7. Government of West Bengal, District Gazetteers of West Bengal.

PG-GEO-ECT-301: Optional Elective Paper (Theoretical – 50 marks / 4 credits)

PG-GEO-ECT-301/A: ENVIRONMENTAL GEOGRAPHY

UNIT-I: Basic Concept

- 1.1: Nature, scope and content of environmental studies in geography.
- 1.2: Ecosystem approach in environmental studies.
- 1.3: Organismic and holistic explanations.
- 1.4: Gaia-hypothesis; Spaceship earth; Deep ecology and Environmentalism in geography.

UNIT-II: Environmental Hazards and Human Impact

- 2.1: Anthropogenic impact on environment: population, resource, development and environment.

2.2: Social Hazards: Poverty and malnutrition, crime and terrorism.

2.3: Human response to flood, drought, landslide, earthquake and cyclone.

2.4: Urban development and ecological consequences; Impact of tourism; Eco-tourism: Case studies from Darjeeling Himalayas.

UNIT-III: Environment and Development

3.1: Resource conservation vs. economic development, global resource scarcity; renewable energy resources and green technology.

3.2: Environmental impact assessment, environmental performance index and environmental audit, environmental management plan.

3.3: Protocols: Montreal, Kyoto and Paris Agreement.

3.4: Sustainable Development: Concept, goals and targets.

UNIT-IV: Environmental Policy and Management in India

4.1: Environmental perception, ethics, laws and policies.

4.2: Environmental movements: Chipko, Silent valley, Narmada and Green Peace.

4.3: Participatory management of forests in India with special reference to West Bengal.

4.4: Environmental management: Case studies of East Calcutta Wetland, wetlands of Murshidabad and neighbouring districts; Institutional set up and role of NGO's in Environmental Management in India.

Suggested Readings:

1. Bennet, R.J. and Chorley, R.J. (1978): Environmental Systems, Methuen, London.
2. Budyko, M.I. (1980): Global Ecology, Progress Publishers, Moscow.
3. Koromondy, E.J. (1989): Concepts of Ecology, Prentice Hall of India Ltd.,N.Y. New Delhi.
4. Odum, E.P. (1971): Fundamentals of Ecology (Philadelphia, Sanders).
5. Stoddard, D.E. (1965): Geography and the Ecological Approach, Geography, vol. 50.
6. Strahler, A.M and Strahler, A.N. (1979): Geography and Man's Environment, John Wiley.

PG-GEO-ECT-301/B: FLUVIAL GEOMORPHOLOGY

UNIT-I: Basics of Fluvial Geomorphology

1.1: Scope, nature and significance of fluvial geomorphology; Scales in Fluvial geomorphology.

1.2: Fluvial system: concept, components, input output, stores of material and energy; Variables of fluvial system: internal and external, adjustable and controlling factors.

1.3: Classification of natural streams by D. L. Rosgen.

1.4: Drainage pattern evolutions, importance of head ward extension and branching, lateral expansion.

UNIT-II: Mechanism of Fluvial Processes

2.1: Hydraulics of channel flow: Stream power and energy; Types of flow: uniform and non-uniform, steady and unsteady, laminar and turbulent, tranquil and rapid, subcritical-supercritical.

2.2: River velocity, factors and its distribution in open channels; Flow resistance and Chézy, Manning and Darcy–Weisbach equation.

2.3: Transportation: processes of entrainment, bed load transport dynamics; Channel competence, capacity and efficiency.

2.4: Sediment deposits: nature and characteristics, flood plain and deltaic plain deposits.

UNIT-III: Channel Morphology

3.1: Channel form and controls on its adjustment; Hydrological properties of channels, concept of equilibrium.

3.2: Channel pattern: straight, sinuous, meandering, braided, anabranching, anastomosing; meander geometry, form-process relationship, migration processes and associated forms.

3.3: Changes of river channel through time: causes and evidences of channel shifting.

3.4: Decay of river channels: causes and consequences.

UNIT-IV: Fluvial Behaviour and Management

4.1: Fluvial hazards: Nature and types; Effect of flood - river bank erosion, channel modification and characterization.

4.2: Flash flood – causes, spatial nature, behaviour, effects.

4.3: Management of river discharge at Farakka Barrage and the problems, management of river bank erosion and floods with reference to West Bengal.

4.4: Regional Fluvial Geomorphology: forms, processes and geomorphic hazards of: a) Terai and Doars, B) Rarh Bengal.

Suggested Readings:

1. Knighton, D. (1998): Fluvial Forms and Processes: A New Perspective, Arnold, London.
2. Morisawa, M. (1985): Rivers, Longman, London.
3. Kondolf, G.M. and Piegay, H. (editors) (2003): Tools in Fluvial Geomorphology, Wiley, Chichester.

4. Huggett, R. (2006): Fundamentals of Geomorphology, Routledge, London.
5. Baker, V., Craig-Kochel, R. and Platton, P.C. (1988): Flood Geomorphology, Wiley, Chichester.
6. Basu, S.R. (2004): Man and Environment, ACB Publishers, Kolkata.

PG-GEO-CCP-301: RS, GIS AND GNSS (Practical – 50 marks / 4 credits)

UNIT-I: Remote Sensing

- 1.1: Concept and types of remote sensing, EMR, types of bands, resolution, sensor, FCC, case of IRS, LANDSAT, SRTM, MODIS, IKONOS, ASTER.
- 1.2: Geo-referencing of maps & images and rectification.
- 1.3: Unsupervised & supervised image classification.
- 1.4: Change detection from multidated maps and images.

UNIT-II: Geographical Information System

- 2.1: Raster to vector conversion.
- 2.2: Spatial analysis through vector overlay.
- 2.3: Preparation of annotated thematic maps.
- 2.4: Preparation of DEM from spot heights, contours and SRTM data.

UNIT-III: Global Navigation Satellite System

- 3.1: Principles of GNSS positioning with special reference to GPS.
- 3.2: Collection and retrieval of GNSS positions.
- 3.3: Preparation of maps from GNSS data.
- 3.4: Length and area measurements from GNSS data.

UNIT-IV: Laboratory Notebook and Viva Voce.

Suggested Readings:

1. Cambell, J.B. (1996): Introduction to Remote Sensing, Tailor and Francis, London.
2. Lillesand, T.M and Kiefer R.W (1979): Remote Sensing and Image Interpretation, John Wiley & Sons, N.Y.
3. Robinson, A.H., Sale, R.D., Morrison, J. (1984): Elements of Cartography, Wiley, New York.

4. Sabins, F.F. (1997): Remote Sensing: Principles and Applications, W.H. Freeman & Company, New York.

SEMESTER IV

PG-GEO-CCT-401: REGIONAL GEOGRAPHY OF INDIA (Theoretical – 50 marks / 4 Credits)

UNIT-I: Regional Issues

- 1.1: Tectonics and environmental problems of the Eastern Himalayas.
- 1.2: Geodiversity and resource utilization of the Indian coasts.
- 1.3: Problems of the arid and semi-arid regions of India.
- 1.4: Ethno cultural diversity of the North East India; Impact of globalization on the diversity.

UNIT-II: Regional Disparities

- 2.1: Infrastructure development in India: Rural-urban dichotomy.
- 2.2: Socio economic disparities: North- south, east- west.
- 2.3: Employment scenario and labour migration.
- 2.4: Gender discrimination and empowerment.

UNIT-III: Management of Natural Resources

- 3.1: Water resources: Big dams and reservoirs, river linkages, micro-watershed planning, water harvesting, safe utilization of ground water.
- 3.2: Forest resources: Policy of conservation with special reference to participatory forest management.
- 3.3: Land resources: Approaches to land resource management- waste land and wet land.
- 3.4: Minerals and Power resources: Problems of mining – open pit, underground and undersea; Advantages and disadvantages of hydel, thermal, nuclear power and non-conventional energy base in India.

UNIT-IV: Socio-Economic Issues

- 4.1: Population: Growth, migration, distribution and changing composition.
- 4.2: Agriculture: Crop combination, problems and prospects.
- 4.3: Industrialization and urbanization: Infrastructural development, problems and recent trends.
- 4.4: Human development: Progress and disparity.

Suggested Readings:

1. Deshpande, C. D., 1992: India: a Regional Interpretation ICSSR & Northern Book Centre.
2. Singh, R. L. (Ed.) 1971: India: A Regional Geography, National Geographical Society, India, Varanasi.
3. Saklani, P. S., (Ed.) 1978: Tectonic geology of the Himalaya, Today and Tomorrow's Printers & Publishers, New Delhi, India, First Edition.
4. Wadia, D. N. 1975: Geology of India, Tata McGraw–Hill Publishing Company Ltd., New Delhi, Fourth Edition.
5. Rawat, T. 2008: Environment of the Himalayas, Eastern Book Corporation
6. Khullar, D.R. 2012: India A Comprehensive Geography, Kalyani Publisher, Ludhiana.

PG-GEO-CCT-402: RESEARCH METHODOLOGY IN GEOGRAPHY (Theoretical – 50 marks / 4 credits)

UNIT-I: Fundamentals of Research

- 1.1: Meaning, objectives and types of research.
- 1.2: Approaches to research in geography.
- 1.3: Research methods and methodology.
- 1.4: Research and publication ethics.

UNIT-II: Hypothesis and Theory

- 2.1: Hypothesis: Development and structure.
- 2.2: Methods of formulation and explanation.
- 2.3: The Theory: Identification, elements and classification.
- 2.4: Testing and validation.

UNIT-III: Sampling and Interview

- 3.1: Sampling: Concept and types.
- 3.2: Sample size and design.
- 3.3: Procedure of sampling.
- 3.4: Observations and modes of collection of data.

UNIT-IV: Preparing a Research Project

- 4.1: Defining a problem.

4.2: Data sources and collection.

4.3: Field work, analysis of data and organizing the writing.

4.4: Referencing style and preparation of bibliography.

Suggested Readings:

1. Ahuja, R. (2001). Research Methodology. Kolkata: Rawat Publication.
2. Das, D. L. (2000). Practice of Social Research. New Delhi: Rawat Publication.
3. Kothari, C. (2009). Research Methodology: Methods and Techniques. Kolkata: New Age International Publishers.
4. Misra, R. (2001). Research Methodology: A handbook. New Delhi: Concept Publishing Company.
5. Mondal, R. Research Methodology for Social Scientist. Concept Publication.
6. Raza, M. (1979). Survey of Research in Geography . Calcutta: Allied Publishers Private Limited.
7. Singh, K. (2007). Quantitative Social Research Methods . New Delhi: Sage Publication.

PG-GEO-CCT-403: POPULATION AND SETTLEMENT GEOGRAPHY (Theoretical – 50 marks / 4 Credits)

UNIT-I: Population Geography

1.1: Changing approaches and contemporary trends to population geography.

1.2: Population: Demographic characteristics, reproduction, health and education; challenges for developed and developing countries.

1.3: Dynamics of population change: Fertility, mortality and migration.

1.4: Population quality: Literacy, occupation and health.

UNIT-II: Theories of Population Growth and Migration

2.1: Theories of population growth: Malthus and Marx.

2.2: Demographic transition and mobility.

2.3: Migration theories: Lee, Ravenstein's law and Zelinsky.

2.4: Population projections.

UNIT-III: Rural Settlement

3.1: Concept of settlement: Rural and urban, census categories of settlement.

3.2: Evolution and growth of rural settlement – India.

3.3: Characteristics of rural settlement, rural service centers and hierarchy.

3.4: Distribution, dispersion and segregation of rural settlements, rural house types in different environmental conditions in India.

UNIT-IV: Urban Settlement

4.1: Definition of urban centers: World and India. Characteristics of urban settlement: Metropolitan concept, concepts of conurbation, megacity, megalopolis, ecumenopolis and necropolis.

4.2: Morphology of towns: Classical and non-classical models. Concepts of urban re-development, renewal, smart cities.

4.3: Theories of spacing of urban settlement; urban hierarchy; concepts of umland and rural-urban continuum.

4.4: Urban housing: Policies, problems with reference to slums and shanties; Concepts of outgrowth and urban sprawl.

Suggested Readings:

1. Ararwala and Sinha, 1977, India's Population Problems, Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
2. Cassen, R.H., 1978, India: Population, Economy and Society, English language Book society and Macmillan
3. Chandna R.C. 2005: Population Geography, Kalyani publishers.
4. Dickinson, R.E. 1968: City and Region: A Geographical Interpretation, Routledge and Kegam Paul Ltd. London.
5. Garnier, J. Beaujeu, 1966, Geography of Population, Commonwealth Printing Press Ltd.
6. Pacione, M., 2001: Urban Geography, Routledge, London.
7. Panda, P.C., 1990, Geomorphology and Rural settlements in India, Chugh Publications.
8. Taylor, G. 1949: Urban Geography, Methuen and Co. Ltd., London.
9. Singh, R. Sandhu (ed) 2003: Urbanisation in India, Sage Publications, New Delhi.
10. Singh, R. Y. 1994: Geography of Settlements, Rawat Pub. Co., New Delhi.

PG-GEO-ECP-401: Optional Elective Paper (Practical – 50 marks / 4 credits)

PG-GEO-ECP-401/A: ENVIRONMENTAL GEOGRAPHY

UNIT-I: Environmental Pollution: Laboratory Techniques

1.1: Determination of acidity and alkalinity of water and soil.

1.2: TSS and TDS in water; BOD and total hardness of water.

1.3: Determination of available pH and organic carbon in soil.

1.4: Measurement of air-pollution, noise pollution.

UNIT-II: Environmental Survey and Mapping Techniques.

2.1: Environmental survey and sampling techniques.

2.2: Preparation of survey schedule/questionnaires for perception survey of natural and social environmental studies.

2.3: Environmental mapping techniques.

2.4: Preparation and interpretation of environmental maps in micro-level.

UNIT-III: Field Techniques and Planning Methods

3.1: Identification and study of an environmental problem in field.

3.2: Correlation and regression analysis (bi-variate and multi-variate), time series analysis of environmental data.

3.3: Application of statistical software in environmental data analysis.

3.4: Preparation of the Environmental Management Plan (EMP).

UNIT-IV: Laboratory Notebook and Viva Voce.

Suggested Readings:

1. Abbasi, A., Krishnakumari, P., & Khan, F. (2000). Hot Topics: Evryday Environmental Concern. Oxford University Press.
2. Alexander, D. 1993: Natural Disasters, Research Press, New Delhi Allaby, M. 1996: Basics of Environmental Science, Routledge, and London Allaby, M. 2006: The Encyclopaedia of Natural Calamities, Viva, Kolkata.
3. Barrow, C. J. (2003). Environmental Change and Human Development. Arnold Publication.
4. Buchholz, R.A. 1993: Principles of Environmental Management, the Greening of Biosphere, Prentice Hall Inc., New Jersey.
5. Canter, L. W. 1996: Environmental Impact Assessment, 2nd edition, McGraw Hill, New York.
6. Khopkar, S. M. (1998). Environmental Pollution Analysis. New Age International Pvt . Ltd, Publishers.
7. Park, C. 1998: The Environment: Principles and Applications, Routledge, London.
8. Venkateswaran, S. 1995; Environment, Development and the Gender Gap, Sage, New Delhi.

PG-GEO-ECP-401/B: FLUVIAL GEOMORPHOLOGY

UNIT I: Analysis of Drainage Basin

- 1.1: Drainage basin identification and delineation from topographical maps and images.
- 1.2: Analysis of drainage basin using GIS software.
- 1.3: Channel bed topography: identification, measurement and analysis.
- 1.4: Textural analysis of river sediments and pebbles using sieves and slide callipers.

UNIT II: Hydro Geomorphology of River Basin

- 2.1: Computation and interpretation of channel parameters –width, depth, wetted perimeter, cross-sectional area, flow parameters.
- 2.2: Mapping of flood inundation and risk zones, vulnerability analysis of floods and riverbank erosion.
- 2.3: Preparation of geomorphological map with the help of R.S & GIS techniques.
- 2.4: Interpretation of morphometric and morphologic changes from topographical maps and images.

UNIT III: Quantification and Interpretation of Fluvial Processes

- 3.1: Computation of channel pattern indices from river planform.
- 3.2: Determination of discharge by using field equipment (Total station, GNSS, echo sounder, and current meter), utility of Manning equation.
- 3.3: Calculation of hydraulic geometry from field data.
- 3.4: Analysis and interpretation of hydrographs, rating curves and flow duration curves.

UNIT-IV: Laboratory Notebook and Viva Voce.

Suggested Readings:

1. Bedinent, P.B.et.al. 2008: Hydrology and Floodplain Management, Prentice Hall,Upper Saddle River,NJ07458.
2. Basu, S. R.: Major changes of the river courses in West Bengal, Observer.
3. Basu, S. R., 1981: Some consideration on the process of sedimentation in Hooghly tidal channel, North Bengal University Review (Science & Technology), Vol.2.
4. Chorley, Richard J., (Ed.), 1969: Water, Earth and Man: A synthesis of Hydrology, Geomorphology and Socio-economic Geography, Methuen and Company Ltd., New York, USA.
5. Chow, Ven Te, (Editor-in-Chief), 1964: Handbook of Applied Hydrology: A Compendium of Water-resources Technology, McGraw–Hill Book Company, New York, USA.

6. Leopold, Luna B., Wolman, M. Gordon and Miller, John P., 1964: Fluvial Processes in Geomorphology, S. Chand and Company Ltd., New Delhi, 1st Indian Reprint.
7. Young, A., 1972: Slopes, Geomorphology Text 3, Oliver & Boyd, Edinburgh, UK, 1st Edition.

PG-GEO-CCP-401: DISSERTATION AND FIELD REPORT (Practical – 50 marks / 4 credits)

Group A	*Dissertation Full Marks 35	Group B	**Field Report Full Marks 15
	Report and Seminar Presentation on Specific problem		Report and Group Presentation

*Text of the dissertation should not exceed 10,000 words and should ideally be divided into the following sections: Introduction, Statement of problem(s), Review of Literature, Objective, Methodology, Information and Analysis, Results, Discussions, Conclusions, References/Bibliography and Appendices (if any). Maps, diagrams and sketches, excluding photographs, should not exceed 50 pages of A4 size paper, typed on 1.5 space and 12 font size format. The Dissertation will be evaluated on the basis of (a) Written Report submitted and (b) Seminar presentation or viva-voce. **This course shall be done through internship or by the resources available in the geography department of Murshidabad University. The mode of preparation of dissertation for the final semester will be done by the department based on available resources.** Out of 35 marks, 20 marks will be allotted to the submission of prepared dissertation and 15 marks will be allotted for presentation of the dissertation or viva voce.

**Size of the Field Report should not exceed 30 A4 size pages with 12 font size and 1.5 spacing. Out of 15 marks, 10 marks will be allotted to the submission of prepared field report and 5 marks will be allocated for presentation of the field report.

Suggested Readings:

1. Goudie, A.(1981): Geomorphological Techniques, George Allen and Unwin, London.
2. Mathur,S.M(2001): Guide to Field Geology, Prentice Hall, India.
3. Pal, S.K. (1999): Statistics for Geoscientists, Concept publishing Company, New Delhi.
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